

Japanese Kokai Patent Publication No. S53-075330, published July 4, 1978;
Application No. S51-151721, filed December 16, 1976; Inventors: Toshihiko MUKAI,
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INSECTICIDE COMPOSITION

1. [Title of Invention]

Insecticide Composition

2. [Claims]

An insecticide composition characterized in that it contains *dl*-cis/trans-3(2,2-dichlorovinyl)-2,2-dimethylcyclopropane -1 -carboxylic acid 3-phenoxybenzyl ester and chlordané.

3. Detailed Explanation of Invention

This invention concerns an insecticide composition that include *dl*-cis/trans-3(2,2-dichlorovinyl)-2,2-dimethylcyclopropane -1 -carboxylic acid 3-phenoxybenzyl ester (hereinafter referred to as permethrin) and chlordané, and the purpose of this invention is to offer an insecticide that has low toxicity for humans and a strong residual effectiveness or effect persistence.

The demand for wood and timber in Japan has been increasing on an annual basis. There is not enough wood produced domestically and imported wood from the northern ocean, southern ocean, and America makes up 60% or more.

Because of the scarcity of the world supply of wood, insect resistance and decay resistance of tree varieties is insufficient. Wood durability and effective utilization are sought to prevent the drying up of resources and treatment of wood and timber with insecticides and anti-decay agents has become the main utilization trend.

Under these circumstances, the authors of this invention have carried out research focused on wood insecticides and accomplished this invention by finding that combining permethrin and chlordané produces a synergistic effect of surprising speed and efficiency without increasing the cumulative toxicity for humans, and moreover, has a great residual effect.

The composition ratio of the effective ingredients of this invention can vary over a broad range. For example, the composition ratio of permethrin and chlordané can be selected at random, in particular, an excellent synergistic insecticide effect can be achieved against white ants and *Lyctus brunneus* Stephens at the ratios of 1:1 ~ 1:10.

The effective ingredients of the insecticide composition of this invention are dissolved in an organic solvent or a suspension agent with a surfactant added as a dispersion agent or an emulsifier. Then, in any form, such as powder or aerosol, it can be

applied to wood by any of the known conventional methods, such as coating, dispersion, impregnation, adhesive mixture method, or pressure injection method.

Next we will explain the results of this invention based on Practical Examples and Experimental Examples. All numbers referring to composition in the Examples are parts by weight.

Practical Example 1

An oil solution [was prepared] by mixing and dissolving 2 parts permethrin, 18 parts chlordane, and 70 parts kerosene.

Practical Example 2

An emulsion [was prepared] from 4 parts permethrin, 16 parts chlordane, 15 parts non-ionic surfactant, and 65 parts xylene.

Practical Example 3

An aerosol was prepared by mixing 0.1 part permethrin, 1.0 part chlordane, 5.5 parts xylene, and 10 parts white kerosene placing them in an aerosol can, and, upon sealing the valve, 83.4 parts Freon were added under pressure.

Experimental Example 1: experiment on killing [illegible]

1 Method: Xylene solutions of permethrin and chlordane mixtures with weight ratios of 1:1, 1:4, and 1:9 were diluted to certain concentrations and pieces of filter paper 9 mm in diameter were impregnated with them for 1 minute and left to be air dried. Thereupon, they were placed in deep bottom laboratory dishes; the filter paper was moistened with 1 ml water and on it 20 [illegible] white ants were placed. The dishes were covered and the insects were bred at a temperature of $28\pm2^\circ\text{C}$ and a relative humidity of 90%. After a certain time, the number of dead insects was determined.

2 Results: According to Table 1

Table 1

	Chemical and concentration (%)	Dead insects over time (%)					
		1 hr	3 hrs	6 hrs	12 hrs	18 hrs	24 hrs
This invention	Permethrin (0.1) +chlordane (0.1)	75	95	100			
	Permethrin (0.01) +chlordane (0.16)	40	65	90	100		
	Permethrin (0.02) +chlordane (0.18)	30	55	80	100		
Comparison	Permethrin (0.2)	10	30	70	100		
	Chlordane (0.2)	0	0	15	40	80	100

Experimental Example 2 Insecticidal Experiment

1 Method: Xylene solutions of permethrin and chlordane mixtures with weight ratios of 1:1, 1:2, 1:3, and 1:9 were diluted to certain concentrations. The liquid was applied to the surface of 5x5 mm of 3-ply plywood at 150 g/m^2 , and left to dry at room

temperature. Then the pieces were placed on the bottoms of deep bottom laboratory dishes 10 adult *Lyctus brunneus* Styrphens were placed on each and bred at a temperature of 25-28°C and a relative humidity of 65-75%. After a certain time, the number of dead insects was determined.

2 Results: According to Table 2

Table 2

This invention	Chemical and concentration (%)	Dead insects over time (%)			
		1 hr	6 hrs	12 hrs	24 hrs
	Permethrin (0.5) + chlordane (0.5)	60	100		
	Permethrin (0.35) + chlordane (0.65)	50	90	100	
	Permethrin (0.25) + chlordane (0.75)	50	80	100	
	Permethrin (0.1) + chlordane (0.9)	40	70	100	
Comparison	Permethrin (1.0)	20	60	100	
	Chlordane (1.0)	0	10	20	60

Experimental Example 3: Residual Effect Experiment

1 Method: A Xylene solution of permethrin and chlordane mixture with a weight ratio of 1:9 was diluted to a certain concentration. The liquid was applied to the surface of 5x5 mm of 3-ply plywood at 150 g/m², and left to dry at room temperature.

Experiments on killing white ant [illegible] were carried out 1 week after the treatment and 8 weeks after the treatment. That is, the plywood was placed into deep bottom laboratory dishes with appropriate moisture and vinyl tape around the pieces, and 20 white ant insects were placed on each. The dishes were covered and the insects were bred at a temperature of 28±2°C and a relative humidity of 90%. After 12 hrs, the number of dead insects was determined.

2 Results: According to Table 3

Table 3

This invention	Chemical and concentration (%)	Dead insects over time (%)	
		In 1 week	In 2 weeks
	Permethrin (0.1) + chlordane (0.9)	100	95
Comparison	Permethrin (1.0)	100	95
	Chlordane (1.0)	60	35

Experimental Example 4: Insecticide Experiment Based on Adhesive-Admixed Plywood

1 Method: A preparation with a mixture of permethrin and chlordane at a ratio of 1:10 was admixed to 1.55% urea melamine adhesive and applied by coating in a conventional method to both sides of red lauan at 36 g/sq. ft, preparing .1 –3.4 –1.1 3-ply plywood. 5x5 mm pieces were cut from this plywood; they were shaved to a single first layer (a) and (to the adhesive (b), preparing two kinds of sample pieces. The same experiment as in Example 3 was conducted.

2 Results According to Table 4

Table 4

	Chemical and concentration (%)	Dead insects within 12 hrs (%)				
		1 hr	3 hrs	6 hrs	12 hrs	24 hrs
This inven	(a)	0	0	5	15	35
	Permethylrin (1.0) + chlordane (10.0) (b)	30	100			
Comparison	Permethylrin (1.0) (a)	0	0	0	0	0
		(b)	0	50	75	100
	Chlordane (1.0) (a)	0	0	0	0	0
		(b)	0	0	0	25
						100

Translations Branch

US Patent and Trademark Office

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April 28, 2006